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RESEARCH ARTICLE

# Knowledge, attitude, and perceptions towards the 2019 Coronavirus Pandemic: A bi-national survey in Africa

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## Abstract

The current Coronavirus (COVID-19) pandemic has impacted and changed lives on a global scale since its emergence and spread from China in late 2019. It has caused millions of infections, and thousands of deaths worldwide. However, the control of this pandemic still remains unachievable in many African countries including Egypt and Nigeria, despite the application of some strict preventive and control measures. Therefore, this study assessed the knowledge, attitude, and perceptions of Egyptians and Nigerians towards the COVID-19 pandemic. This study was designed as a cross-sectional community-based questionnaire survey in both countries. Participants' demography, knowledge, attitude, and perceptions towards the COVID-19 outbreak were obtained using a convenience sampling technique. Data collected were subjected to descriptive statistics and logistic regression analysis. A total of 1437 respondents were included in this preliminary report. The mean knowledge score was 14.7 2.3. The majority of the respondents (61.6%) had a satisfactory knowledge of the disease. Age (18±39 years), education (College/bachelors), and background of respondents were factors influencing knowledge levels. The attitude of most respondents (68.9%) towards instituted preventive measures was satisfactory with an average attitude score of 6.9 1.2. The majority of the respondents (96%) practiced self-isolation and social-distancing but only 36% follow all health recommendations. The perception of most respondents (62.1%) on the global efforts at controlling the virus and preventing further spread was satisfactory with an average score of 10.9 2.7. Only 22% of the respondents were satisfied with their country's handling of the pandemic. An apprehensive understanding of the current status in Africa through studies like KAP is crucial to avoid Africa being the next epicenter of the pandemic. For the populace to follow standard infection prevention and control

measures adequately, governments need to gain the trust of citizens by strengthening the health systems and improving surveillance activities in detecting cases, to offer the optimum health services to their communities.

## Introduction

The World Health Organization (WHO), on December 31, 2019, received a report of the presence of unknown causes of pneumonia disease in Wuhan, China [1]. Later, this disease was defined as a novel Coronavirus disease and further declared as a public health emergency of international concern by January 30, 2020 [2]. The novel virus was renamed by the International Committee on Taxonomy of Viruses, as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that causes the 2019 Coronavirus disease (COVID-19) [3, 4]. COVID-19 is caused by a single-stranded RNA virus belonging to the Coronaviridae family [5]. This disease is similar to the previously emerged SARS-CoV and the Middle East respiratory syndrome Coronavirus (MERS-CoV) [6]. Still, unlike these, its outbreaks have taken a global pandemic course. Since the first report of the confirmed cases of the COVID-19 in Wuhan, China [1, 7], the world has witnessed severe unprecedented mortality and morbidity due to this disease resulting in serious public health emergencies. Infection by SARS-CoV-2 in humans occurs mainly through air droplets, close contact with infected persons, especially mucus membranes secretions from nose, mouth, or eyes, contaminated surfaces, and some studies suggest digestive tract transmission [8, 9].

Despite the level of advancement in health systems in high-income countries, they appeared to be the worst hit in terms of disease burden and the total COVID-19 related deaths. The epidemic curve is still rising in Russia and some low- and middle-income countries like India, Peru, and Chile [10]. This is a strong warning to the low- and middle-income countries in Africa especially with the enormous socio-economic and health-related challenges observed in the continent [11]. No proven treatments or vaccines are available to control COVID-19 and thus pose a significant threat to healthcare delivery. To flatten the curves, most nations, including African countries, have applied strict prevention and control measurements to curb the disease including regulations such as general lockdown, obligatory home quarantine, ban on public gatherings, international flights restrictions and raising awareness on proper hand wash, hygiene, and sanitation as well as social distancing [12].

The rate of infection due to COVID-19 on the African continent is on the increase, especially in Egypt in the north and Nigeria in the west. As of June 29, 2020, there are more than 382,600 confirmed cases, above 9700 deaths, and around 147,000 recoveries due to COVID-19 in Africa [13], with approximately 24% of these cases from Egypt and Nigeria alone. To stop this pandemic, it is imperative to institute effective infection prevention and control practices globally, nationally, and at the community level. Consequently, it is urgent to understand the public knowledge, reactions, adherence to, and acceptance of such measures that affect their daily life in several ways, especially psychologically, socially, and physically. This could be achieved through knowledge, attitude, and practice (KAP) studies [14, 15]. The information generated from such studies, in addition to comprehensive reviews and recommendations, could help in the fight against COVID-19 and similar future threats [14–17] by improving the awareness level of the citizens and encourage positive attitudes which are necessary to beat the pandemic. These are necessary for both countries especially with the onset of community spread of the disease.

In this study, we investigated the KAP of participants from two African countries (Egypt and Nigeria), towards the COVID-19 outbreak. This is a first report on the knowledge, attitude, and practices of participants with a scope covering more than one African country. Findings from this study would contribute to the global efforts to control the COVID-19 pandemic.

## Materials and methods

### Study design

This survey instrument was published online on the 9th of April 2020 as a cross-sectional survey of respondents from two selected African countries–Egypt and Nigeria. Both countries were chosen because they were the first two African countries to record positive COVID-19 cases. More so, they currently ranked second and third in the total COVID-19 African disease burden. Egypt and Nigeria had 68% and 33.4% of all cases from the northern and western regions of Africa, respectively.

### Study participants, sample size and sampling

The targeted respondents from both countries include adults >17 years of all educational levels both medical and non-medical backgrounds. To calculate the sample size for this survey, we hypothesized that at a 99.9% confidence interval, 50% of the respondents would have a satisfactory knowledge level of COVID-19. Using the Open Source Epidemiologic Statistics for Public Health (OpenEpi), v.3.01 (updated 2013/04/06), the needed sample size was 1083 respondents. We further added a 30% contingency to the sample size. Thus, a minimum of 1,408 respondents were targeted from both countries. Since Nigeria's internet users were twice those of Egypt, the respondents were sampled in a ratio of at least 1 (Egypt):3 (Nigeria). Participants were recruited using a convenience sampling method. Only participants with internet access were considered for this survey. The online survey started on the 9th of April and the preliminary dataset (n = 1437) was extracted on the 11th of May 2020. Due to the spread of the COVID-19 pandemic and the lockdown policy enforced in both countries, a physical and paper-based questionnaire was not feasible. Thus, respondents were reached via emails and social media platforms such as WhatsApp and Facebook messenger simultaneously in both countries. Initially, respondents from major cities, Lagos/Ilorin (Nigeria) and Cairo/Alexandria (Egypt) were recruited before the questionnaire administration spread to participants from other major cities and towns across the two countries. The online web-based survey was administered in the official languages (Arabic and English) of both countries.

### Ethical considerations

The Kwara State Ministry of Education, Ilorin, Nigeria (reference number: DE/PRIM/96/VOL.1/137) approved this study. This approval suffices for the surveys in both countries. Participation was anonymous and voluntary. Informed consent was sought from the respondents and participants could withdraw from the survey at any time in line with stipulations of the World Medical Association Declaration of Helsinki Ethical principles [18].

### Questionnaire design

We administered a structured questionnaire using google forms (Alphabet Inc., California, USA). The survey tool (Supplementary file 1) is available online. The questionnaire was pre-validated by three independent reviewers, and a pre-test study was conducted with 20 respondents from Nigeria. The responses from the pre-test were not included in the analyzed data

but used to improve upon the quality of the questionnaire. The questionnaire consisted of 5 parts: a). Demography of respondents b). Knowledge of Coronavirus (COVID-19), c). Attitude towards preventive measures d). Perception of the global response, and e). Community response to the pandemic. The survey was designed as a multiple-choice question (quiz). We provided the correct answers to all questions wrongly answered by the respondents as feedback. All questions and responses were based on the latest recommendations by the WHO [1, 3]. Section B tested their knowledge of/focused on disease spread, symptoms, incubation period, and how to limit infection. Section C evaluated their attitude towards preventive measures by focusing on questions related to hand hygiene, wearing face masks, and social distancing. Sections D and E assessed their perception of global and community response efforts to the pandemic with particular emphasis on ways to prevent future occurrence of such outbreaks.

## Data analysis

Data were summarized using Microsoft Excel 2019 and analyzed utilizing the Statistical Package for the Social Sciences (SPSS) software, v.22, and the OpenEpi. To summarize the obtained data, the demographic characteristics of respondents were subjected to descriptive statistics (frequency and proportions). To assess knowledge, attitude, and perception levels of respondents, a numeric scoring pattern was used, and outcome (dependent) variables–knowledge, attitude, and perception–were computed [19]. These outcome variables were further categorized as binary (satisfactory or unsatisfactory) based on cut-off (mean scores) marks (Table 1). Respondents receiving scores greater than the mean scores for knowledge (14.7 2.3), attitude (6.9 1.2), and perception (10.9 2.7) were deemed to be satisfactory responses and vice versa. Chi-square test was used to test for association between independent variables (demographics) and outcome variables (knowledge, attitude, and perception) at a 95% confidence interval with significant variables ($p < 0.05$) subjected to a logistic regression model.

## Results

### Respondent demographics

A total of 1437 respondents were included in this preliminary survey. Most respondents (83.3%, n = 1197/1437) were between the ages of 18–39 years. Similarly, the majority of the respondents (84.9% n = 1220/1437) have a bachelor/master's degree (Table 2). Respondents with a scientific/medical background accounted for 59.3% of the responses (n = 852/1437).

### Knowledge, attitude, and perception of respondents towards COVID-19

Knowledge. The mean knowledge score was 14.7 2.3, from a maximum obtainable score of 20 (Table 1). Most respondents (61.6% n = 885/1437) had satisfactory knowledge of the

Table 1. Description of scores obtained by respondents (n = 1437).

| Outcome variables | Maximum obtainable scores | Scores received by respondents | | Mean SD | Satisfactory n (%) | Unsatisfactory n (%) |
|---|---|---|---|---|---|---|
| | | Minimum score | Maximum score | | | |
| Knowledge | 20 | 5 | 18 | 14.7 2.3 | 885(61.6) | 552(38.4) |
| Attitude | 9 | 2 | 9 | 6.9 1.2 | 990(68.9) | 447(31.1) |
| Perception | 17 | 1 | 16 | 10.9 2.7 | 892(62.1) | 545(37.9) |

Cut-off marks—mean scores i.e. Knowledge—14.7, Attitude—69 and Perception—10.9, Satisfactory scores—scores > mean score obtained by respondents, SD—standard deviation.

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Table 2. Demographics of respondents from Nigeria and Egypt used in this preliminary study (n = 1437).

| Variable | Number of respondents (%) |
|---|---|
| Age (years) | |
| 18–29 | 706 (49.1) |
| 30–39 | 491 (34.2) |
| 40–49 | 168 (11.7) |
| 50–59 | 51 (3.5) |
| >59 | 21 (1.5) |
| Gender | |
| Male | 754 (52.5) |
| Female | 677 (47.1) |
| Prefer not to say | 6 (0.4)) |
| Education | |
| No formal education | 2 (0.1) |
| High School | 60 (4.2) |
| College (Bachelor) | 897 (62.4) |
| Masters | 323 (22.5) |
| Ph.D. | 91 (6.3) |
| Others | 64 (4.5) |
| Background | |
| Non-Scientific/Non-Medical | 585 (40.7) |
| Scientific/Medical | 852 (59.3) |
| Nationality | |
| Nigeria | 1132 (78.8) |
| Egypt | 305 (21.2) |

%—percentage.

https://doi.org/10.1371/journal.pone.0236918.t002

disease, and the internet was the main source of information for most respondents (83.7%, n = 1204/1437). Moreover, most (78%, n = 1127/1437) of the respondents knew that COVID-19 was different from the common cold. The majority of the respondents (83%, n = 1195/1437) knew that it is possible to have asymptomatic COVID-19 positive patients. Most of the participants (95%, n = 1365/1437) also knew that most symptoms appear between 1–14 days. Most respondents also correctly identified several symptoms of COVID-19, knew how to kill (inactivate) the virus, and recognized the importance of handwash in reducing the chances of contracting the disease (S1 Table). All of the independent variables (age, gender, level of education, background, and nationality) were significantly ($p < 0.05$) associated with the knowledge of respondents about COVID-19.

Attitude. The participants' attitude towards COVID-19 was satisfactory as the mean attitude score was 6.9 1.2, with a range of 2 to 9 (Table 1). Most of the respondents (68.9%, n = 990/1437) had a positive attitude towards protective measures being advised by the WHO or their local health authorities (Table 1). Most respondents (81%, n = 1164/1437) valued the importance of proper hygiene, self—isolation, the use of face mask when going out, and the ideal distance between two people in curbing the spread of the virus (S2 Table). Some of the respondents (48%, n = 690/1437) were bored, fearful, and anxious to return to the "new normal". Due to the compulsory lockdown, which has psychosocially affected the lifestyle of most Nigerians and Egyptians people have adapted by following the social media platforms (84%, n = 1207/1437), among other means of changing.

Perception. Most of the participants (62.1%, n = 892/1437) had a positive perception of global efforts to control the pandemic (Table 1). Although most of the participants (81%, n = 1163/1437) agreed with the compulsory lockdown to prevent the further spread of the disease, but only 38.6% (n = 554/1437) believe that the government had done enough to protect its citizens. Most respondents (77%, n = 1110/1437) rated their country's national COVID-19 response plan below average (1–3 on a scale of 5) (S3Table).

The satisfactory knowledge of the respondents had a positive impact ($p < 0.001$) on their attitudes towards preventive measures and their perception of a community response to curb the spread of the virus (S3Table). Most respondents (>81%, n = 1163/1437) agreed that improved personal hygiene, reducing social contacts, and following their countries' health recommendations are necessary to reduce disease burden and reduce the person to person transmission. The majority of the study participants (66%, n = 945/1437) believed that we can prevent a future pandemic by reducing international travels (33%, n = 472/1437), establishing improved early alerts and global warning systems for infectious diseases (82%, n = 1175/1437) and improving disease surveillance in both human and animal health sectors (73%, n = 1044/1437) (S4Table).

## Demographic factors influence knowledge, attitude and perception of respondents on COVID-19

Study participants within the 18–29 years age range were 1.4 (95% CI: 0.55–0.89, $p = 0.004$) more likely to be knowledgeable than other age groups. Respondents with a high school education were at least 4.7 (95% CI: 0.15–144.7, $p = 0.73$) more likely to have satisfactory knowledge about COVID-19 than those with no formal education. As expected, participants with scientific or medical backgrounds were 1.4 (95% CI: 0.56–0.86, $p < 0.001$) more likely to be knowledgeable than those with non-scientific/non-medical background. Egyptians were 1.8 (95% CI: 0.43–0.74, $p < 0.001$) more likely to have more satisfactory knowledge than Nigerians (Table 3).

The age, gender, level of education, background, and nationality had a significant impact on the attitude towards COVID-19 (Table 4). The older the respondents, the better their attitude towards the disease with an odds ratio ranging from 1.34 (95% CI: 1.06–1.74, $p = 0.019$) to 6.65 (95% CI: 0.17–206.9, $p = 0.692$). Female participants were 1.59 (95% CI: 1.27–1.99; $p < 0.001$), more likely to have a positive attitude towards COVID-19 than males. Respondents of scientific/medical background were 1.6 (95% CI: 0.49–0.78, $p < 0.001$) more likely to have better attitude than those with non-scientific/non-medical background. Nigerians were 11 (95% CI: 7.57–13.47, $p < 0.001$) more likely to have a positive attitude than Egyptians (Table 4).

The level of education, background, and nationality greatly affected the perception of global and community response to curbing the spread of COVID-19 and preventing the occurrence of any future pandemic. Educated respondents were 2.58 (95% CI: 0.09–77.55, $p > 0.999$) to 6.54 (95% CI: 0.21–202.40, $p = 0.543$), more likely to have positive perceptions of the global response than non-educated participants. Similar to the attitude, scientific/medical respondents were 1.6 (95% CI: 0.56–0.87, $p < 0.001$) more likely to have better perceptions of the global response than those with non-scientific/non-medical background (Table 5).

## Discussion

To the best of our knowledge, this research is one of the first studies examining the knowledge, attitude, and perceptions (KAP) toward COVID-19 in two of the most populated countries in Africa, Nigeria, and Egypt. Both countries announced the occurrence of their first COVID-19

Table 3. Analysis of demographic characteristics as factors influencing the knowledge levels of respondents from Nigeria and Egypt towards the COVID-19 pandemic.

| Variables | | Satisfactory (%) | Unsatisfactory (%) | P-value( !2) | OR | 95%CI | P-value |
|---|---|---|---|---|---|---|---|
| Age(years) | | | | | | | |
| | 18–29 | 406(45.87) | 300(54.34) | 0.021 | 1.00 | - | - |
| | 30–39 | 324(36.61) | 167(30.25) | | 0.69 | 0.55–0.9 | 0.004 |
| | 40–49 | 107(12.09) | 61(11.05) | | 0.77 | 0.54–1.0 | 0.168 |
| | 50–59 | 33(3.72) | 18(3.26) | | 0.74 | 0.41–1.4 | 0.392 |
| | >59 | 15(1.69) | 6 (1.08) | | 0.46 | 0.16–1.2 | 0.178 |
| Gender | | | | | | | |
| | Male | 445(50.29) | 309(55.97) | 0.032 | 1 | - | - |
| | Female | 438(49.49) | 239(42.90) | | 0.79 | 0.63–0.9 | 0.031 |
| | Prefernot to say | 2 (0.22) | 4 (0.73) | | 2.88 | 0.52–15.2 | 0.390 |
| Education | | | | | | | |
| | No formal education | 2 (0.22) | 0 (0.00) | 0.028 | 1.00 | - | - |
| | High School | 31(3.50) | 29(5.25) | | 4.68 | 0.15–144.0 | 0.727 |
| | College(Bachelor) | 537(60.67) | 360(62.51) | | 5.04 | 0.17–150.0 | 0.659 |
| | Masters | 219(24.74) | 104(18.84) | | 2.37 | 0.08–71.3 | >0.999 |
| | Ph.D. | 61(6.89) | 30(5.43) | | 2.46 | 0.08–75.6 | >0.999 |
| | Others | 35(3.95) | 29(5.25) | | 4.14 | 0.13–127.9 | 0.796 |
| Background | | | | | | | |
| | Non—Scientific/ Non–Medical | 330(37.28) | 255(46.19) | 0.01 | 1.00 | - | - |
| | Scientific/Medical | 555(62.72) | 297(53.81) | | 0.69 | 0.56–0.8 | 0.001 |
| Nationality | | | | | | | |
| | Egypt | 219(24.74) | 86(15.57) | 0.01 | 1.00 | - | - |
| | Nigeria | 666(75.26) | 466(84.43) | | 1.78 | 1.35,2.35 | <0.001 |

!2—chi-square; DF—degree of freedom; OR—odds ratio; CI: confidence interval; - excluded from the multivariable logistic regression analysis
—significant at $p < 0.05$

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cases in February 2020 [13, 20, 21]. Since then, the number of cases has increased with over 91,000 confirmed cases and over 3200 deaths [10, 13]. It has been predicted that low- to middle- income countries, especially in Africa would face difficulties controlling the spread of the disease due to their low level of preparedness accompanied by low resources allocated, which could lead to catastrophic consequences [22]. Thus, this KAP study contributes to a better understanding of the current situation, obstacles, and solutions for policy formation by the decision-makers [22]. Most of the respondents (62%) had a satisfactory knowledge level of the disease and the preventive measures against it. This is because both countries have a well-educated population (bachelor/master's degree holders), mostly between 18 to 39 years (83%), and an average knowledge score of 74% indicated that most respondents were knowledgeable on COVID-19. It is also possible that the seriousness of the global pandemic in addition to daily updates from public health agencies in respective countries would have prompted the need to learn and acquire knowledge on COVID-19. However, this score is lower than the previous KAP studies on COVID-19 in China and Iran in which participants had an overall knowledge score of 90% [16, 23].

The internet (social media platforms-84%) and TV (44%) were the main source of information for the participants. This is similar to the report by Abdelhafiz et al. [24] where Facebook was the main source of information for young adults in their survey in Egypt. The internet (social media platforms) and TV had proved helpful for respondents to adapt to the physical

Table 4. Analysis of demographic characteristics as factors influencing the attitude of respondents from Nigeria and Egypt towards the COVID-19 pandemic.

| Independent variables | | Satisfactory (%) | Unsatisfactory (%) | P-value( !2) | OR | 95%CI | P-value |
|---|---|---|---|---|---|---|---|
| Age | | | | | | | |
| | 18–29 | 513(51.81) | 193(43.17) | 0.002 | 1.00 | - | - |
| | 30–39 | 325(32.82) | 166(37.13) | | 1.34 | 1.06–1.7 | 0.019 |
| | 40–49 | 99(10) | 69(15.43) | | 1.85 | 1.31–2.6 | <0.001 |
| | 50–59 | 40(4.04) | 11(2.46) | | 0.73 | 0.37–1.5 | 0.470 |
| | >59 | 13(1.31) | 8(1.78) | | 3.48 | 1.66–7.2 | 0.002 |
| Gender | | | | | | | |
| | Male | 555(56.06) | 199(44.52) | <0.001 | 1.00 | - | - |
| | Female | 431(43.53) | 246(55.03) | | 1.59 | 1.27–1.9 | <0.001 |
| | Prefer not to say | 4(0.40) | 2(0.45) | | - | - | - |
| Education | | | | | | | |
| | No formal education | 0(0.00) | 2(0.44) | 0.045 | 1.00 | - | - |
| | High School | 36(3.63) | 24(5.37) | | 0.13 | 0.004–4.13 | 0.2504 |
| | College(Bachelor) | 637(64.34) | 260(58.16) | | 0.08 | 0.003–2.44 | 0.1186 |
| | Masters | 219(22.12) | 104(23.26) | | 0.09 | 0.003–2.85 | 0.1501 |
| | Ph.D. | 56(5.65) | 35(7.82) | | 0.13 | 0.004–3.82 | 0.2265 |
| | Others | 42(4.24) | 22(4.92) | | 0.10 | 0.003–3.25 | 0.1813 |
| Background | | | | | | | |
| | Non—Scientific/ Non–Medical | 367(37.07) | 218(48.76) | <0.001 | 1.00 | - | - |
| | Scientific/Medical | 623(62.92) | 229(51.24) | | 0.62 | 0.49–0.8 | <0.001 |
| Nationality | | | | | | | |
| | Egypt | 86(8.68) | 219(48.99) | <0.001 | 1.00 | - | - |
| | Nigeria | 904(91.32) | 228(51.11) | | 0.09 | 0.07,0.13 | <0.001 |

!2—chi-square; DF—degree of freedom; OR—odds ratio; CI: confidence interval

- excluded from the multivariable logistic regression analysis

—significant at $p < 0.05$

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social restraints during the COVID-19 compulsory lockdown in Nigeria and Egypt. Also, almost half of our respondents (49%) were very satisfied with the social media coverage of the pandemic. This is lower than the 67% satisfaction rating of the social media coverage reported in Egypt [24]. On the contrary, Roy et al. [25] reported 67% of Indians felt worried after receiving social media updates on the global burden of COVID-19.

The significant associations ($p < 0.05$) observed in this study between age, education, nationality, and background and the knowledge score of COVID-19 were similar to reports from other KAP studies from China, Egypt, and India in which participants who were well educated young or with high socioeconomic level had better knowledge of COVID-19 than others [16, 24, 25].

Although this study was conducted during the compulsory lockdown in both countries, the optimistic attitude of Egyptians and Nigerians could be seen in a mean attitude score of 6.9 1.2. Most (67%) of the respondents had generally satisfactory attitudes, recognizing the importance of social distancing (96%), and following the health recommendations (92.5%). However, only 36% followed all the recommendations. This might be due to the severe economic hardship faced by the citizens of both countries associated with workers who need to earn their daily wages and the poor government palliative plans for the citizens. This is further buttressed by the fact that only 22% of the respondents were convinced that their governments have done enough to curb the spread of the SARS-CoV-2. This distrust in the management of

Table 5. Analysis of demographic characteristics as factors influencing the perceptions of respondents from Nigeria and Egypt towards the COVID-19 pandemic.

| Independent Variables | | Satisfactory(%) | Unsatisfactory (%) | P-value( !2) | OR | 95%CI | P-value |
|---|---|---|---|---|---|---|---|
| Age | | | | | | | |
| | 18±29 | 439(49.21) | 267(48.99) | 0.888 | - | - | - |
| | 30±39 | 301(33.74) | 190(34.86) | | - | - | - |
| | 40±49 | 104(11.65) | 64(11.74) | | - | - | - |
| | 50±59 | 35(3.92) | 16(2.93) | | - | - | - |
| | >59 | 13(1.42) | 8(1.47) | | - | - | - |
| Gender | | | | | | | |
| | Male | 473(53.02) | 281(51.55) | 0.732 | - | - | - |
| | Female | 416(46.63) | 261(47.88) | | - | - | - |
| | Prefer not to say | 3(0.33) | 3(0.55) | | - | - | - |
| Education | | | | | | | |
| | No formal education | 2(0.22) | 0(0.00) | 0.03 | 1.00 | - | - |
| | High School | 26(2.91) | 34(6.23) | | 6.54 | 0.21±202.40 | 0.54 |
| | College(Bachelor) | 553(61.99) | 344(63.11) | | 3.11 | 0.10±92.94 | 0.95 |
| | Masters | 213(23.87) | 110(20.18) | | 2.58 | 0.09±77.55 | >0.99 |
| | Ph.D. | 57(6.39) | 34(6.23) | | 2.98 | 0.09±91.26 | 0.98 |
| | Others | 41(4.59) | 23(4.22) | | 2.81 | 0.09±86.84 | >0.99 |
| Background | | | | | | | |
| | Non-Scientific/ Non-Medical | 334(37.44) | 251(46.05) | 0.001 | 1.00 | - | - |
| | Scientific/Medical | 558(62.56) | 294(53.95) | | 0.69 | 0.56±0.87 | 0.001 |
| Nationality | | | | | | | |
| | Egypt | 165(18.49) | 140(25.68) | 0.001 | 1.00 | - | - |
| | Nigeria | 727(81.51) | 405(74.32) | | 0.66 | 0.51±0.85 | 0.002 |

!2-chi square, DF-degree of freedom; OR-odds ratio; CI: confidence interval
-significant at $p < 0.05$

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the pandemic might also be due to the low testing capability, and lack of strict enforcement of the compulsory lockdown. More so, in many African countries, reports of porous borders, congested cities, increased hunger and poverty, poor health literacy, and expensive face masks and hand sanitizers have all been obstacles against control measures [26].

All of the respondents agreed on the importance of handwashing and other preventive measures in reducing the chances of being infected. A similar positive attitude towards most preventive measures were earlier reported in Egypt [24] and India [25] but the later noted some reluctancy in following some recommendations such as the use of a face mask. In another study conducted in China, most of the participants followed health recommendations and less than 4% went to crowded places or went outside without a face mask. Chinese were also optimistic about the success of their COVID-19 control program [16]. In our study, 96% of respondents considered self-isolation essential and effective, hence avoiding places with confirmed COVID-19 cases. This finding may support the lower number of recorded cases initially observed in Egypt and Nigeria. Comparably, in a KAP study conducted by Chan et al. [27] on the H7N9 influenza pandemic, most respondents did not take the seasonal influenza as serious as 42.3% of the respondents did not avoid going to places that had the H7N9 confirmed cases.

While some participants were bored (52%), nervous/anxious (47%), afraid (44%), and stressed (30%). Others felt optimistic (18%) and happy (1.4%). Sixty-six (66%) of Nigerians

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